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ship to the Tardigrades and the Pentastoma, the latter being a degraded worm, living parasitically within the bodies of other animals.

EXPLANATION OF PLATE VI.

Fig. 1. Larva of a bird mite, *Dermaleichus*.
Fig. 2. Pupa (?) of the same.
Fig. 3. Adult female of the same.
Fig. 4. Larva of *Typhlodromus pyri* Scheuten. (From Scheuten.)
Fig. 5. Larva of another species of *Typhlodromus*. " "
Fig. 6. *Chelytus* (probably undescribed).
Fig. 7. *Sarcoptes scabiei* DeGeer. (From Gervais.)
Fig. 8. *Heteropus ventricosus* Newport, fully-formed female. (From Newport.)
Fig. 9. *Heteropus ventricosus* Newport, gravid female. (From Newport.)
Fig. 10. *Ixodes bovis* Riley.
Fig. 11. *Ixodes unipunctata* Packard.

THE FRESH-WATER AQUARIUM.

BY C. B. BRIGHAM.

(Continued from page 212.)

THE question is often asked what kinds of plants are the best for the aquarium, and where are they found? Most writers on this subject give long lists of plants, which are useless to those who are unacquainted with the botanical names. To the majority of people not even the common names of most water plants are known, and to such it becomes very perplexing to make a selection from a list bare of any description. Although it is insisted by some that the tank should not be filled with every kind of plant that the collector can obtain, yet it seems as if there was no sound reason why all the plants that flourish in the aquarium should not be placed therein. In a properly managed aquarium there are very few water plants which will not do well; the few exceptions being found in the lilies, which require a deeper soil than is convenient in the tank, and in those plants accustomed to a lower temperature of the water than is easy to maintain. Apart from these take any of the green plants found in ponds, and placing them in the tank, watch their growth, and a few weeks' trial will determine their value whether they are of use or for ornament. It is hardly practicable to arrange the plants in the tank in botanical order, the room is so limited. A better way, if we wish such an arrangement, would be to devote a separate tank to each variety. This could easily be done in what is called the cabinet aquarium, which will be noticed hereafter. An affair of this sort enables one to have a large collection of plants, changing the light or temperature as the case requires.

Before giving the names of a few of our native plants which are favorites in the aquarium, it may be well to say a few words as to the locality in which most are found, for to one who takes a real interest in the aquarium, it will not suffice to pick out a few plants here and there from the collections of dealers in specimens, which by the way are not numerous. Half of the pleasure, to say nothing of the profit in having an aquarium, is in hunting for one's own specimens, and in realizing that there is much more life in the waters of a pond than we before imagined. To those who pass some time during the year in the country, there will be ample means for collecting specimens in the ponds near by; but to residents of cities the task will not be so easy, although it will depend a good deal upon the facilities for getting into the country. Take for example the two cities of Boston and Worcester. A ride of fifteen minutes in the steam cars will take one from the former place to Fresh Pond, in Cambridge, which is rich in aquarial specimens. The brooks in the marshes, near what is called the "Glacialis," abound in larvæ, fresh-water snails, and the smaller specimens, while Fresh Pond itself contains nearly all our common water plants. Tritons, or fresh-water newts, are not to be found there, but not so with small turtles, which at certain seasons of the year, especially in the fall, are quite common. There is, I believe, no place equally near Boston, which has so complete a collection of aquarial specimens as Fresh Pond. Worcester offers great advantages to the collector in its beautiful Long Pond, or, as it is recently called, Lake Quinsigamond. The pond itself has few plants on account of its depth, but if we follow it up to the river which helps to form it, and then to the other pond above, near the place where a few years ago the old mill house stood, we shall find all the specimens we could wish for. In this upper pond the plants, instead of growing with the various kinds, mingling recklessly together as usual, are found in a general way, with each kind in a large patch by itself as if some one had planted them so, making as it were an aquatic botanical garden. We may go in the opposite direction down the pond, a few miles below the bridge which crosses it, until we come to the dam which separates Long from what is called Half-moon Pond. If it is midsummer, and early in the morning, we shall find ourselves surrounded by acres of water-lilies, beneath which are the desired specimens. All along from this dam, towards Grafton, a chain of shallow ponds connected by rivers invites our attention, and the scenery alone would be a sufficient inducement to bring the naturalist to the spot. The three kinds of plants which are the best suited for the aquarium, of all our natives, are *Ceratophyllum demersum; Utricularia vulgaris, inflata*, and *minor; Potamogeton natans, Claytonii*, and others.*

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*They are thus described by Dr. Gray. (Manual of Botany of the Northern States. By Asa Gray. 1867.)

" *Ceratophyllum:* Hornwort. Sterile flowers of 12–24 stamens, with large sessile anthers. Fruit an achemium, beaked with the slender persistent style. Herbs growing under water in ponds or slow flowing streams. The sessile leaves cut into thrice-forked thread-like rigid divisions (whence the name from κέρας, a horn, and φυλλον, a leaf)."

" *Utricularia:* Bladderwort. Lips of the 2-parted calyx entire or nearly so. Corolla personate, the palate on the lower lip projecting, often closing the throat. Anthers convergent, aquatic and immersed, with capillary dissected leaves bearing little blad-

Besides these plants the floating Duckweed (*Lemna trisulca*) is a very valuable addition to the collection. Water-lily plants are not only difficult to make grow, but their leaves are apt to be ill-proportioned to the size of the tank. In duckweed both these troubles are done away with, for we have a plant which is easily grown, and one which gives to the aquarium the appearance of a miniature pond. It is found in brooks at the roadside and in shallow ponds, especially in the autumn season. The *Limnocharis Humboldtii*, a lily sometimes grown in tanks in greenhouses, is also a good plant for the aquarium, where, if care be taken, it will blossom freely. There is a moss-like plant of bluish green color, found growing on stones in brooks, and under bridges in shady places in the water. It is called *Fontinalis antipyretica*, and it is one of the few brook plants that will do well in the aquarium. The water buttercup, *Ranunculus aquatilis*, has only its beauty to recommend it, for it hardly survives the winter in the tank. A plant of the Frog's-bit family, *Anacharis Canadensis*, is another excellent one for the aquarium. It gives to the fresh-water aquarium an appearance similar to that which the *Ulva latissima* gives to the marine tank.

Having made a collection of plants, and thoroughly washed them, the next thing is to arrange them in the tank. This arrangement must be according to the taste of the collector. One way, perhaps as good as any, is to make four bunches of plants of suitable size, and place one in each corner of the tank if it is rectangular; they do not then ob-

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ders, which are filled with air and float the plant at the time of flowering; or rooting in the mud, sometimes with few or no leaves or bladders (name from *Utriculus*, a little bladder)."

"*Potamogeton:* Pond-weed. Flowers perfect. Sepals 4, rounded, valvate in the bud. Stamens 4, opposite the sepals; anthers nearly sessile, 2-celled. Ovaries 4 (rarely only one), with an ascending campylotropous ovule. Stigma sessile, or on a short style. Fruit drupe-like when fresh, more or less compressed; endocarp (nutlet) crustaceous. Herbs of fresh or one in brackish ponds and streams, with jointed, mostly rooting stems, and 2-ranked leaves, which are usually alternate or imperfectly opposite. The submersed ones pellucid, the floating ones often dilated and of a firmer texture (an ancient name composed of ποταμός, a river, and γειτων, a neighbor, from their place of growth)."

struct the view of the tank; they take up the room which is the least valuable of any, and yet can be seen to great advantage. As the plants grow the tops of the branches meet and form an arch of green on all sides of the rockwork in the centre. They may be held in position, as was suggested by a friend, by fastening to them, by a thread or fine piece of string, a small stone of sufficient weight to anchor the plants and keep them in place. If this is not done, and the plants left to themselves or with the ends of their stems simply held down by a stone placed over them, we shall find them continually being turned upside-down by the mussels, turtles, or other live stock of the aquarium.—*To be continued.*

REVIEWS.

THE INJURY DONE TO FORESTS BY INSECTS.*—Before giving our readers an idea of the contents of these volumes, we must first express the delight and wonder we have felt at the industry and skill exhibited in this magnificent work. It is a thorough monograph of the natural history of the forest insects, and the injury done by them to forest trees in Germany, by one of the best of living naturalists, who, by his previous works on Forest Insects (Die Forstinsecken, 1839–44), has, more than any other writer perhaps in Europe, built up the science of economical entomology. It is of the class of works to which Audouin's superb, and now very rare, volume on the insects of the Vine, Curtis' Farm Insects, Boisduval's recent work on horticultural entomology, and Harris' Insects of Massachusetts injurious to vegetation, are examples. Such works as these are an honor to any state or country, and do more to bring abstract scientific studies into favor with the masses, demonstrating the direct money value of the labors of the naturalist, than any other class of books. In the elaborate and beautifully executed plates that enrich the two volumes before us is reproduced the tree as it stands in the forest, gnarled and distorted by one set of insects, its leaves curled and turned yellow, or red, by the attacks of others, with certain branches stripped by still others; and not only are certain trees and shrubs thus represented in colors, but some of the plates represent parts of a forest, showing the

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*Die Waldverderbniss oder dauernder Schade, welcher durch Insektenfrass, Schalen Schlagen und Verbissen an lebenden Waldbaumen entsteht. Von Dr. J. T. C. Ratzburg. 2 vols, 4to. Berlin, 1866–'68. With fifty-seven plates and numerous wood-cuts. $20.00 in gold.